

MONTHLY WEATHER REVIEW.

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The MONTHLY WEATHER REVIEW is based on data from about 3500 land stations and many ocean reports from vessels taking the international simultaneous observation at Greenwich noon.

Special acknowledgment is made of the data furnished by the kindness of cooperative observers, and by Prof. R. F. Stupart, Director of the Meteorological Service of the Dominion of Canada; Señor Manuel E. Pastrana, Director of the Central Meteorological and Magnetic Observatory of Mexico; Camilo A. Gonzales, Director-General of Mexican Telegraphs; Capt I. S. Kimball, General Superintendent of the United States Life-Saving Service; Commandant Francisco S. Chaves, Director of the Meteorological Service of the Azores, Ponta Delgada, St. Michaels, Azores; W. N. Shaw, Esq., Secretary, Meteorological Office, London; H. H. Cousins, Chemist, in

charge of the Jamaica Weather Office; Señor Anastasio Alfaro, Director of the National Observatory, San José, Costa Rica; Rev. L. Gangoiti, Director of the Meteorological Observatory of Belen College, Havana, Cuba.

As far as practicable the time of the seventy-fifth meridian, which is exactly five hours behind Greenwich time, is used in the text of the MONTHLY WEATHER REVIEW.

Barometric pressures, both at land stations and on ocean vessels, whether station pressures or sea-level pressures, are reduced, or assumed to be reduced, to standard gravity, as well as corrected for all instrumental peculiarities, so that they express pressure in the standard international system of measures, namely, by the height of an equivalent column of mercury at 32° Fahrenheit, under the standard force, i. e., apparent gravity at sea level and latitude 45°.

SPECIAL ARTICLES, NOTES, AND EXTRACTS.

NOTE ON EVAPORIMETERS.¹

By B. F. E. KEELING, Superintendent Precise Survey, Survey Department, Egypt. Dated Helwan Observatory, Helwan, Egypt, January 2, 1906.

The following note on evaporimeters is suggested by an article on the Piche evaporimeter in the MONTHLY WEATHER REVIEW for June, 1905.

In view of the all important question of water supply in Egypt, evaporimetry is a subject of great interest to meteorologists here. A systematic investigation of the actual evaporation from different classes of water surfaces and cultivated land is being undertaken.

The article in the MONTHLY WEATHER REVIEW for June, 1905, pages 253-5, gave a résumé of Prof. Thomas Russell's experiments on the Piche evaporimeter. A comparison of the values obtained with the different evaporimeters installed at the Helwan Observatory [of the Survey Department, latitude 29° 51' 34" N., longitude 31° 20' 30" E.], will probably be of interest.

(A) The instrument which has been considered as standard has been an open pan Wild evaporimeter mounted in a Renou screen, one and one-half meters by one meter, with double louvered walls. The pan has an area of 250 square centimeters, or about seven and one-half times that used by Professor Russell. When full the water surface is 1.3 centimeters below the rim. Besides this two other evaporimeters have been observed at irregular intervals during the past year.

(B) Of these one is a Piche evaporimeter mounted in the same screen as the Wild instrument. The evaporating surface of the paper disk is about 11.4 square centimeters in area.

(C) The other is an instrument recently designed by Mr. E. B. H. Wade, of the Survey Department of Egypt. Outside the observatory is a tank four meters square and one meter deep, filled with water. In the center of this is a zinc cylinder 50 centimeters in diameter which receives a separate supply of water. The water in this cylinder is automatically maintained to a constant level by an instrument which at the same time measures the quantity of water supplied, i. e., the quantity evaporated from the inner water surface. The water in the outer tank merely acts as a guard ring. The water is fully exposed to sun and wind.

In the accompanying Table 1, are given the ratios Piche/Wild and Wade/Wild. It will be seen that the mean ratio Piche/Wild

is 1.45, or about 10 per cent greater than the factor found by Professor Russell. This is probably accounted for by the difference in dimensions of the evaporimeters used, particularly by the relatively large size of the Wild pan. The ratio Wade/Wild is 1.37.

Taking only the months August, October, November, and December of 1905 the ratio Wade/Piche is 0.96.

TABLE 1.—Comparison of the Wade, Wild, and Piche evaporimeters.

Month.	No. of days.	Mean evaporation by Wild.	Ratio— Wade Wild	Difference from final mean.	No. of days.	Mean evaporation by Wild.	Ratio— Piche Wild	Difference from final mean.
		mm.		Per cent.		mm.		Per cent.
1904.								
August	27	9	1.45	+6				
September	13	8	1.37	0				
1905.								
May	24	14	1.33	-3				
June	28	13	1.37	0				
July	6	9	1.49	+9				
August	23	10	1.44	+5	31	10	1.45	+1
September	5	12	1.41	+3	28	9	1.52	+6
October	24	9	1.20	-6	31	10	1.39	-3
November	29	7	1.32	-4	29	7	1.45	+1
December	23	4	1.38	+1	22	4	1.39	-3
		Weighted mean	1.37			Weighted mean	1.44	

NOTE.—The weighted means above given will vary in accordance with the adopted system of weights. If, for instance, we give the respective ratios for the last five months equal values without regarding the number of days of observation or the quantity of evaporation we get the following results:

$$\text{Wade/Wild} = 1.37$$

$$\text{Piche/Wild} = 1.44$$

$$\text{Wade/Piche} = 0.95$$

If, on the other hand, we give weights depending on the total quantity of evaporation, or the product of the number of days in the second and sixth columns by the millimeters in the third and seventh columns, respectively, then we get the following results:

$$\text{Wade/Wild} = 1.36$$

$$\text{Piche/Wild} = 1.44$$

$$\text{Wade/Piche} = 0.94$$

In general the average of any series of observed ratios is correctly found only by reducing each to a common denominator, and then giving each a weight corresponding to its own specific reliability.

¹ By permission of the Director General, Survey Department, Egypt.